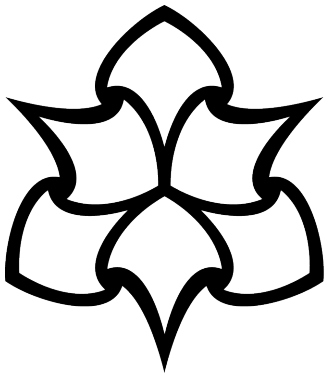

Maladaptive schemas as a potential mechanism through which irrational beliefs relate to psychological distress in athletes.

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Abstract

Objectives

The psychological wellbeing of athletes, in particular the concept of psychological distress, is receiving growing research attention. Irrational beliefs as proposed in Rational Emotive Behaviour Therapy (REBT) have been shown to be positively related to the psychological distress of athletes, but the mechanisms by which irrational beliefs predict psychological distress remain unclear. The role of maladaptive schema, as proposed in Schema Therapy (ST), in the relationship between irrational beliefs and psychological distress has not yet been studied, despite the conceptual similarities between REBT and ST.

Design and method

Participants were self-selected triathletes (n = 124), duathletes (n = 9), swimmers (n = 7), cyclists (n = 17) and runners (n = 57). A single timepoint cross-sectional study design was used to investigate simple mediation models using the PROCESS macro.

Results

Results revealed that maladaptive schema fully mediated the positive relationship between irrational beliefs and symptoms of anxiety, and depression.

Conclusions

These findings suggest that maladaptive schema is a potential mechanism through which irrational beliefs predict psychological distress. Results may help practitioners begin to understand how REBT and ST may be applied in tandem for the benefit of greater athlete psychological wellbeing.

Keywords: CBT; emotion; sport; triathlete; duathlete

Maladaptive schemas as a potential mechanism through which irrational beliefs relate to psychological distress in athletes.

Psychological distress is "a state of emotional suffering characterized by symptoms of depression and anxiety" (Drapeau, Marchand, & Beaulieu-Prévost, 2012, p.105). Psychological distress negatively impacts on individuals' social functioning and day-to-day living (Wheaton, 2007), is a criterion for some psychological disorders (e.g., major depression; generalized anxiety disorder; Paukert et al., 2009; Watson 2009). The prevalence of psychological distress it is thought to range between 5% and 27% in the general population (Benzeval & Judge, 2001; Chittleborough et al., 2011; Gispert et al., 2003; Kuriyama et al. 2009), reaching higher levels in populations exposed to specific risk factors such as stressful work conditions (e.g., Marchand, Demers, & Durand 2005). Hence, psychological distress is an important construct to examine in athlete populations, because the athletic context is rife with high demands and pressure (Fletcher & Arnold, 2017; Hughes & Leavey, 2012; Nixdorf, Frank, Hautzinger, & Beckmann, 2013), and taking part in sport at an elite level may present some mental health risks. A systematic review concerning the mental health of elite athletes (Rice et al., 2016) showed that major life events, including injury, were associated with higher rates of distress, anxiety, and depression. Rice et al. (2016) report depression prevalence rates for elite athletes of up to 34% (Armstrong & Oomen-Early, 2009; Hammond et al., 2013), and depression and anxiety combined (psychological distress) of up to 26% (Gouttebarge, Frings-Dresen, & Sluite, 2015). However, depression prevalence rates have also been as low as 15% (Nixdorf et al., 2013), with population demographics, method of assessment, and sample size, varying across studies.

Given that the objectives of many published studies of psychological distress are essentially descriptive (Drapeau et al., 2012), there is a dearth in research concerning the cognitive antecedents of psychological distress, particularly in athlete populations. When

viewed through a cognitive-behavioural lens, it is not yet fully understood whether and to what extent cognitive mediators (e.g., thoughts, attitudes, and beliefs) are involved in the mental health of athletes. The extant research in sport indicates that contextual factors are predictive of psychological distress (Fletcher, Hanton, & Wagstaff, 2012; Hughes & Leavey, 2012; Nixdorf et al., 2013), but cognitive-behavioural approaches maintain that it is not events that cause emotional reactivity, rather, a transaction occurs between the environment and emotions through cognitive mediation (Fletcher, Hanton, & Mellalieu, 2006; Turner, 2016). One cognitive-behavioural approach to mental health that incorporates this transactional viewpoint and has garnered growing interest in sport literature (e.g., Turner & Bennett, 2018), is Rational Emotive Behaviour Therapy (REBT; Ellis, 1957).

In REBT it is not an event that causes psychological distress, but the beliefs that one has about that event that causes psychological distress. In REBT there is an emphasis on individuals' beliefs (rigid, extreme, and illogical; Dryden, 2009) about events as a risk factor for psychological distress, rather than the adversity or stressor alone. Irrational beliefs comprise a primary irrational belief and three secondary beliefs (awfulizing, low frustration tolerance, and depreciation). Much research indicates that high irrational beliefs are positively related to psychological distress (e.g., Browne, Dowd, & Freeman, 2010; Vîslă, Fluckiger, Holtforth, & David, 2015), and one study has reported a positive relationship between irrational beliefs and psychological distress in athletes (Turner, Carrington, & Miller, 2019), and another reported that irrational beliefs predicted increases in burnout in Gaelic footballers (Turner & Moore, 2015). Additional research in athletic populations needed to further investigate these initial findings. A greater understanding of how irrational beliefs relate to psychological distress in athletes is important because REBT offers a potentially effective approach to helping athletes to reduce psychological distress (Turner,

2016; Wood, Turner, & Barker, 2018), but due to scant research, the confident application of REBT as an intervention for athlete psychological distress cannot be extolled.

The National Institute for Health and Care Excellence (NICE) in the United Kingdom, guidelines for anxiety (NICE, 2011) and depression (NICE, 2016) both recommend Cognitive Behavioural Therapy (CBT) as treatment. CBT is a family of therapies in which a variety of approaches are presented, such as Cognitive Therapy (CT; Beck 1976), Acceptance and Commitment Therapy (ACT; Hayes, 2018), REBT (Ellis, 1957), and Schema Therapy (ST; Young, 1999). As such, it is reasonable to hypothesise that all of these CBTs can be effective in athletes experiencing psychological distress, depending on the idiosyncrasies of the athlete and the context, and that these approaches are not mutually exclusive. In REBT theory, irrational beliefs are hypothesized to lead to automatic thoughts (e.g., Ellis 1994; Beck 2008), and REBT and CT share some similar conceptual and practical ideas (Ellis, 2005). Some past research has elucidated mechanisms that are represented in other CBTs through which irrational beliefs, as proposed within REBT, may predict psychological distress. For example, research indicates that irrational beliefs and automatic thoughts, as proposed in CT (Beck, 1976) may co-occur to atemporally predict psychological distress (e.g., Buschmann, Horn, Blankenship, Garcia, & Bohan, 2018; Szentagotai & Freeman, 2007). This initial research has generated a need to further investigate how irrational beliefs and cognitive constructs from other CBTs co-occur to predict psychological distress (David & Szentagotai, 2006).

One CBT that has sparsely been investigated in sport literature is ST, which is surprising given the that the core constructs of ST (maladaptive schemas) are salient to the pursuit of personal goals. Maladaptive schemas are defined as “extremely stable and enduring themes that develop during childhood, are elaborated throughout an individual’s lifetime, and are dysfunctional to a significant degree. These schemas serve as templates for the processing

of later experience" (Young, 1999, p. 9). Maladaptive schemas are character traits (see Young et al., 2003), that develop through a lack of fit between a child's natural developmental needs and their environment which should provide for those needs. A lack of fit means the child's needs are not sufficiently met and maladaptive schemas are the consequence of the child's attempt to cope with this deficit (Linehan, 1993). In adulthood these schemas are activated in relevant situations and result in dysfunctional perceptions that govern the way a person sees themselves, others, and the world in that moment.

Of particular relevance to athletes are the maladaptive schemas of unrelenting standards, failure to achieve, and defectiveness. Unrelenting standards reflect a belief that "one must strive to meet" (Ohanian & Rashed, 2012, p.172) very high internalized standards of behaviour and performance (Young et al., 2003). Defectiveness is described as the feeling that there is something wrong with you (Young et al., 2003), and failure to achieve reflects the belief that one is fundamentally inadequate in areas of achievement (Ohanian & Rashed, 2012). Of the very sparse literature, one known study of handball and rugby players (Gherghişan, 2015) found that unrelenting standards was particularly high across the samples. Gherghişan (2015) also suggests that competitive environments may trigger maladaptive schemas due to the emotional nature of competition, and the recalling of past experiences. In non-athletic samples, unrelenting standards is one of the most often endorsed schemas (Rijkeboer, Van den Bergh, & Van den Bout, 2005; Waller, Meyer, & Ohanian, 2001).

Not only are maladaptive schemas potential relevant for athletes, they may co-occur with known associates of psychological distress to help explain the occurrence of athlete psychological distress. Specifically, some researchers suggest that maladaptive schemas and irrational beliefs share some conceptual characteristics (Sava, 2009; Szentagotai, Schnur, DiGiuseppe, Macavei, Kallay, & David, 2005), whilst others indicate that some irrational beliefs might be better thought of as schemas (DiGuiseppe, 1996). However, there is little

existing evidence to support the notion that irrational beliefs and maladaptive schemas are positively related, and there are some conceptual differences that cast doubt on their supposed similarities. For example, irrational beliefs are considered to be 'irrational' because they are rigid, extreme, and illogical (Turner, 2016). These adjectives that are not associated with maladaptive schemas in the revised and comprehensive definition of maladaptive schemas (Young et al., 2013). In addition, although Sava (2009) posited that unrelenting standards are similar to primary irrational beliefs, chiefly because both contain rigid demands on the self, the data did not support this assertion. It could be argued that the maladaptive schemas defectiveness (e.g., "there is something wrong with me") and failure to achieve (e.g., "I have achieved nothing") are similar to the irrational belief of depreciation (e.g., "I am complete failure"), as they all reflect an extreme negative view of the self (e.g., Young et al., 2003). But apart from semantic similarities, there is no evidence to suggest that irrational beliefs and maladaptive schemas are related. Whilst REBT and ST share a common taxonomy (both are CBTs), each proposes different cognitive factors causing psychological distress, and in line with this fact, there are differences in their affective mechanisms, and as a result, their core therapeutic processes.

One common feature that irrational beliefs and maladaptive schemas do share, is that they are both positively related to greater psychological distress. In particular, maladaptive schema 'failure to achieve' and 'defectiveness' have been found to be positively related to psychological distress (e.g., Calvete et al., 2005; Muris, 2006). Research has yet to examine whether these findings remain in athlete samples. The aforementioned relationship between irrational beliefs and psychological distress (Visla et al., 2016) have been supported in athlete samples (Turner et al., 2019). But no research has examined the co-occurrence of irrational beliefs and maladaptive schemas to predict psychological distress. In sum, there is some debate concerning the conceptual similarities between irrational beliefs and maladaptive

schemas that have sparsely been investigated, and whilst the research examining REBT and irrational beliefs in sport is burgeoning (e.g., Turner & Bennet, 2018), the theory and practice of ST in sport remains relatively unexplored. A deeper understanding of whether and to what extent irrational beliefs and maladaptive schemas co-occur to predict psychological distress may offer a more complex understanding of mental health risk factors in athletes, and help practitioners begin to understand how REBT and ST may be applied in tandem for the benefit of greater athlete psychological wellbeing.

The purpose of the current study is to consider irrational beliefs and maladaptive schemas in relation to psychological distress in a sample of athletes participating in one or all of the sports of running, cycling, and swimming (e.g., duathletes, and triathletes). We seek to understand the conceptual linkage between irrational beliefs and maladaptive schemas, and how they interact to relate to athlete psychological distress, for the first time in research. Cognitions do not exist within a vacuum, and constructs from difference CBTs can co-occur (e.g., Buschmann et al., 2018) to explain psychological distress. Therefore, the aims of the current study were twofold. First, we examined associations between the four core irrational beliefs and maladaptive schemas (defectiveness, failure to achieve, and unrelenting standards), a seldom undertaken endeavour. Second, we examined the effects of irrational beliefs and maladaptive schemas on anxiety and depression symptomology (psychological distress). It is not known, nor has it been it postulated, about the extent to which irrational beliefs and maladaptive schemas co-occur to relate to athlete psychological distress. The current study has one main hypothesis and an exploratory hypothesis. First, it was tentatively hypothesised that the four core irrational beliefs would be positively related to all three maladaptive schemas. Second, due to the novel and exploratory nature of the current study, we made an exploratory hypothesis concerning the co-occurrence of irrational beliefs and maladaptive schemas, and the interaction between these two constructs in the atemporal

prediction of psychological distress. On the basis of past research findings that automatic thoughts account for the effect of irrational beliefs on distress in a mediation model (Buschmann et al., 2018), we expected maladaptive schemas to account for the effect of irrational beliefs on athletes psychological distress.

Method

Participants

Participants were 214 (*female* = 94) self-selected competitive triathletes (*n* = 124), runners (*n* = 57), duathletes (*n* = 9), cyclists (*n* = 17), and swimmers (*n* = 7), who ranged in age from 18 to 72 (*Mage* = 42.24, *SDage* = 10.54) based in the United Kingdom. 78 athletes (*female* = 33) competed at club/regional level for an average of 3.40 years (*SD* = 2.60), 74 athletes (*female* = 28) competed at national level for an average of 4.20 years (*SD* = 3.00), and 62 athletes (*female* = 33) competed at international level for an average of 5.60 years (*SD* = 3.50). Females competed at their highest level for an average of 4.60 years (*SD* = 3.20), and males competed at their highest level for an average of 3.90 years (*SD* = 3.10).

Design

A single timepoint cross-sectional study design was used to investigate simple atemporal mediation models. The tested models were constructed in line with cognitive behavioral theory (REBT and ST), such that psychological distress (anxiety and depression) functioned as the Y variable, whilst irrational beliefs and maladaptive schemas functioned as either the X of M variable. The models tested in the current study reflect the extent literature, and the temporal order of the included variables is not ambiguous. However, the current methodology does not include a temporal component, and therefore does not test cause and effect, rather, we examine atemporal mediation effects (e.g., Winer, Cervone, Bryant, McKinney, Liu, & Nadorff, 2016).

Measures

Irrational Beliefs. The irrational Performance Beliefs Inventory (iPBI; Turner et al., 2018) is a measure of irrational beliefs in performance settings such as sport and in line with REBT theory assesses four core irrational beliefs, namely primary irrational beliefs (e.g., "I need others to think that I make a valuable contribution"), low-frustration tolerance (e.g., I can't stand not reaching my goals"), awfulizing (e.g., "It's awful to not be treated fairly by my peers"), and depreciation (e.g., "I am a loser if I do not succeed in things that matter to me"). The iPBI comprises 28-items, 7-items for each core irrational beliefs. Items are rated on a Likert-scale from 1 (*strongly disagree*) to 5 (*strongly agree*) with higher scores indicating greater irrational beliefs. The four subscales were summed and averaged to form a composite irrational beliefs variable (Turner et al., 2018). The iPBI is valid and reliable for use with athletes (Turner et al., 2019; Turner & Allen, 2018), and internal consistency (Cronbach's alpha) in the current sample was between .75 and .88 for the four subscales which shows good internal reliability and .93 for the composite score demonstrating excellent internal reliability.

Maladaptive schemas. Three subscales, defectiveness, failure to achieve, and unrelenting standards, were used from the full Young Schema Questionnaire (YSQ; Young, 2005); YSQ-S3 (Welburn, Coristine, Dagg, Pontefract, & Jordan, 2002). The YSQ has been used with a wide variety of clinical (Calvete et al., 2005; Waller et al., 2001) and non-clinical populations (Rijkeboer, van den Bergh & van den Bout, 2005). Each subscale is assessed using 5-items about attitudes, beliefs, and expectations about the self and others, and participants rated each item on a Likert-scale from 1 (*completely untrue of me*) to 6 (*describes me perfectly*). For example, the respondent is asked to respond to items such as "I'm unworthy of the love, attention, and respect of others" (defectiveness), "I'm incompetent when it comes to achievement" (failure to achieve), and "I must be the best at most of what I do; I can't accept second best" (unrelenting standards). The items produce

three subscale scores ranging from 5 to 30, with a higher score indicating greater maladaptive schemas. The three subscales were summed and averaged to produce a total maladaptive schemas variable for subsequent analyses. Internal consistency (Cronbach's alpha) was between .84 and .91 for the three subscales and .86 for the total score, which shows good internal reliability.

Psychological distress. In line with recent literature, psychological distress was assessed using two separate and prominent measures of depression and anxiety symptomology. Specifically, the Patient Health Questionnaire (PHQ-9; Kroenke, Spitzer, & Williams, 2001) was used to measure depression and is used nationally in NHS Increasing Access to Psychological Therapies (IAPT) services as a standard measurement and screening tool for depression. The PHQ-9 has 9-items that assess frequency in symptoms of depression over the last two weeks, rated on a Likert-scale from 0 (*not at all*) to 3 (*nearly every day*). For example, one item asks how often the respondent has been "feeling down, depressed, or hopeless". The items produce a total score between 0-27, with a higher score indicating greater depression symptoms. The range in PHQ-9 data was 0-12, and internal consistency (Cronbach's alpha) was .85 showing good internal reliability.

The General Anxiety Disorder Questionnaire (GAD-7; Spitzer, Kroenke, Williams & Lowe, 2006) was used to measure anxiety symptoms. Similar to the PHQ-9, the GAD-7 is used in NHS IAPT services as a standard measurement and screening tool for anxiety. The GAD-7 comprises 7-items that assess frequency of anxiety symptoms over the last two weeks rated on a Likert-scale from 0 (*not at all*) to 3 (*nearly every day*). For example, one item asks how often the respondent has been "feeling nervous, anxious, or on the edge". The items produce a total score between 0 – 21, with a higher score indicating greater anxiety symptoms. The range in PHQ-9 data was 0-11, and internal consistency (Cronbach's alpha) was .89 showing good internal reliability. The total scores from the PHQ-9 and the GAD-7

were combined, known as the PHQ-ADS (e.g., Chilcot et al., 2018; Kroenke et al., 2016), to form a single psychological distress variable.

Procedure

Participants were recruited using convenience, snowball, and random sampling via social media. Convenience sampling was achieved by liaising with U.K. sport and exercise psychologists and researchers to gain access to athlete groups with whom they worked. Snowball sampling was achieved by encouraging participants, on completion of the survey, to send the details of the study to other potential participants that may or may not take part in sport. Random sampling was achieved via a social media campaign targeting sporting organizations to engage their athletes in the project. We adopted multiple sample recruitment devices to limit self-selection and sampling biases associated with a single approach to sample recruitment. The four questionnaires (iPBI, YSQ-S3, PHQ-9, and GAD-7), along with demographics questions (age, sex, sport competed, and current level), were distributed to participants interested in taking part using the online survey platform Qualtrics. Research has shown that online versions of questionnaires have the same psychometric properties as paper versions (Riva, Teruzzi, & Anolli, 2003), but also allow data to be collected nationally and multi-nationally.

The first page of the survey gave participants information about the study, and the type of participants required. Participants needed to agree with a description of people being competitive in sport, rather than just taking part, to continue. The next three questions ensured that participants were eligible to take part. If they answered that they were under 18, had a mental health problem, or did not consent to their data being used for research, they automatically directed to the end thank you page. After giving consent to take part, participants completed the questionnaire, after which they were thanked and then signposted to independent support services in case the questionnaire triggered some discomfort around

psychological distress. Ethical approval was gained from a University Ethics Board and informed consent was gained from all participants prior to all data collection. All procedures in line with the ethical standards of the Helsinki Declaration.

Analytic strategy

In order to determine the sample size for mediation analyses, a power analysis was conducted using G*Power (Faul, Erfelder, Bucnhner, & Lang, 2014). The analysis was based off multiple linear regression, with a small-medium effect size (f^2) of .30 (consistent with past research; Calvete et al., 2005), an alpha of .05, a standard power level of .80, and a total of 2 predictors. The results of the power analysis showed that a minimum of 36 participants would be needed for each of the six tests (n = 216 total) for an appropriate power level.

Collected data were first screened for missing values, normality, and outliers. Missing data (0.1%) were replaced using SPSS expectation maximisation. Although Kolmagorov-Smirnov tests were significant, given the large sample size in the current study, the Central Limit Theorem was applied to assume normality of the data. The data were checked for normality and outliers more than two standard deviations from the mean (4%) were Windsorized (Reifman & Keyton, 2010; Smith, 2011). Main data analyses were conducted in two phases. First, Pearson's correlation analyses were conducted to examine the bivariate associations between all self-report variables (Table 1).

Second, following similar research (e.g., Buschmann et al., 2018) simple atemporal mediation analyses were conducted (n = 6 models), one for each combination of mediators. To achieve this, irrational beliefs and maladaptive schemas are tested in simple atemporal mediation (Winer et al., 2016) models to examine maladaptive schemas as a potential mechanism through which irrational beliefs are related to psychological distress in the present athlete sample. The atemporal mediation analyses conducted in the current study follow the models presented by Szentagotai and Freeman (2007) and Buschmann et al. (2018). In the

present study, the extent to which maladaptive schemas account for the already distinguished relationship between irrational beliefs and psychological distress (Turner et al., 2019), is examined in an athlete sample. Importantly, alternate analyses test the atemporal mediational effects of irrational beliefs on the, as yet to be determined, relationship between maladaptive schemas and psychological distress in athlete populations. That is, we conducted three mediation analyses in which maladaptive schemas acted as the mediator between irrational beliefs and anxiety (model 1), depression (model 2), and psychological distress (model 5), and three mediation analyses in which irrational beliefs acted as the mediator between maladaptive schemas and anxiety (model 3), depression (model 4), and psychological distress (model 6). Due to the range of athlete levels and ages in the current sample, age and competitive level were entered into each model as covariates (e.g., Turner et al., 2019).

For mediation analyses, we used the PROCESS macro (model 4; Hayes, 2013) in IBM SPSS was used. A bootstrapping procedure (with bias corrected confidence intervals [CI]) was performed to estimate indirect effects (Preacher & Hayes, 2008). The bootstrapping process involved 5,000 resamples and statistical significance of indirect effects was determined using 95% CIs. Recent research has used PROCESS to conduct simple atemporal mediation analyses with irrational beliefs and psychological distress (Turner et al., 2019).

Results

Relationships between irrational beliefs and maladaptive schemas

Pearson's correlation co-efficients (Table 1) revealed that the only non-significant associations were between PIB and defectiveness, PIB and failure to achieve, and failure to achieve and unrelating standards. Importantly for the mediation analyses, composite irrational beliefs were positively and significantly related to total maladaptive schemas, anxiety, and depression, and in addition, total maladaptive schemas was positively and significantly

related to anxiety, and depression. Subsequently, four simple mediation analyses were conducted (Table 2).

Co-occurrence of irrational beliefs and maladaptive schemas in relation to psychological distress

For Models 1, 2, and 5 (Figures 1a, 1b, and 1e) there was a significant overall effect, and a significant indirect effect, indicating that total maladaptive schemas significantly mediated the relationship between composite irrational beliefs and anxiety (β = .14, CI: .061, .231), depression (β = .18, CI: .107, .271), and psychological distress (β = .17, CI: .097, .255). In essence, the models in which maladaptive schemas acted as the mediator between irrational beliefs and psychological distress, significant mediation was revealed. The analyses showed that whilst irrational beliefs were positively (with a moderate effect; Preacher & Kelly, 2011) related to psychological distress, the addition of maladaptive schemas weakened (to non-significance, and small effects) the association between irrational beliefs and psychological distress.

For Models 3, 4, and 6 (Figures 1c, 1d, and 1f) there was a significant overall effect, but no significant indirect effects emerged, indicating that composite irrational beliefs did not significantly mediate the relationship between total maladaptive schemas and anxiety (β = .05, CI: -.019, .119), depression (β = .04, CI: -.027, .113), and psychological distress (β = .05, CI: -.015, .119). In essence, the models in which irrational beliefs acted as the mediator between maladaptive schemas and psychological distress, significant mediation was not revealed. The analyses showed that maladaptive schemas was positively (with a moderate-large effect) related to psychological distress, the addition of irrational beliefs did not significantly weaken (to non-significance) the moderate-large association between maladaptive schemas and psychological distress.

Discussion

The main aim of the current study was to explore the extent to which irrational beliefs and maladaptive schemas co-occur to relate to psychological distress. Based on past research investigating the role of automatic thoughts in the relationship between irrational beliefs and psychological distress (Buschmann et al., 2018; Szentagotai & Freeman, 2007) we expected maladaptive schemas to account for the relationship between irrational beliefs and psychological distress in the current sample. To test this hypothesis, we conducted two sets of simple atemporal mediation models. One set included maladaptive schemas as the mediator variable between irrational beliefs (X) and psychological distress (Y; anxiety and depression separately, and combined), and one set included irrational beliefs as the mediator variable between maladaptive schemas (X) and psychological distress (Y; anxiety and depression separately, and combined). We also examined associations between irrational beliefs and maladaptive schemas, and the between-subjects differences between females and males across irrational beliefs, maladaptive schemas, and psychological distress. It was hypothesised that the four core irrational beliefs would be positively related to the three maladaptive schemas.

Results demonstrated that maladaptive schemas fully atemporally mediated the positive moderate relationship between irrational beliefs and symptoms of anxiety, and depression. That is, whilst irrational beliefs were positively related to psychological distress, the addition of maladaptive schemas weakened (to non-significance) the association between irrational beliefs and psychological distress. Findings demonstrated that participants who reported high irrational beliefs also reported high maladaptive schemas, and that this association demonstrated a large effect. Importantly, it is the shared variance between irrational beliefs and maladaptive schemas that is more strongly related to psychological distress, rather than irrational beliefs alone. That is, with maladaptive schemas in the models, there was little evidence that irrational beliefs influenced anxiety and depression, as the effect

was reduced from a moderate to a small, non-significant, effect. The direct effects between irrational beliefs and anxiety and depression were moderate and significant, supporting swathes of past research with general and clinical samples (see Visla et al., 2016, for a meta-analysis) and some recent research with athletes (Turner et al., 2019). But the current study suggests that the positive relationship between irrational beliefs and psychological distress is explained through maladaptive schemas. This is important because it reveals that maladaptive schemas is a potential mechanism through which irrational beliefs are related to psychological distress, a finding demonstrated in past research but with automatic thoughts (e.g., Buschmann et al., 2018) rather than maladaptive schemas. Indeed, irrational beliefs and maladaptive schemas explained 44% of variance in psychological distress, which is comparable to Buschmann et al. (2018) who reported that irrational beliefs and automatic thoughts explained 56% of variance in depression. Therefore, maladaptive schemas and automatic thoughts appears to be important mechanisms through which irrational beliefs relate to psychological distress.

The atemporal mediation findings of the current study are potentially important because they suggest a more complex relationship between irrational beliefs and psychological distress, that researchers and practitioners should be mindful of when studying and working with athletes presenting with high anxiety and or depression. In addition, the correlational findings demonstrated significant positive relationships between specific irrational beliefs and specific maladaptive schemas. The moderate positive associations between irrational depreciation beliefs (as proposed in REBT) and maladaptive defectiveness schema (as proposed in ST) are of particular note due to the potential conceptual convergence between these two constructs. Depreciation reflects the global negative evaluation of the self, others and life, such as “because I have failed, I am a complete failure”. In comparison, defectiveness reflects beliefs that one is defective, bad, unwanted, inferior, or invalid

(Ohanian & Rashed, 2012). Therefore, defectiveness has much in common with depreciation conceptually with their focus on negative, absolute, and global beliefs about the self.

Correlational and atemporal mediational analyses suggest that those with greater psychological distress are more likely to also have greater irrational beliefs and maladaptive schemas. Athletes suffering with symptoms of psychological distress require accurate and comprehensive cognitive assessment that, on the basis of the current study, should include both irrational beliefs and maladaptive. When assessing risk factors for psychological distress it is important to understand how cognitions and beliefs interact to predict ill-being. But more importantly, when intervening with psychological distress it may be appropriate to apply ST and REBT in conjunction, in order to address both irrational beliefs and maladaptive schemas. There is clearly a difference in how a practitioner would work with an athlete depending on whether REBT or ST is adopted. REBT is more present and future oriented, whilst ST is more about healing past pain. Therefore, an athlete whose psychological distress symptomology stems from depreciation (as proposed in REBT) and defectiveness (as proposed in ST), for example, may require disputation of depreciation as is common in REBT (Turner, 2016), and require the use of rescripting imagery to create a feeling that an unmet childhood need is indeed being met as used in ST (Arntz, 2012). This would involve engaging the athlete in the empirical, logical, and pragmatic socratic challenging of the depreciation belief, as well as encouraging the athlete to change the meaning of emotional memories and images through imagery. Indeed, both REBT and ST include imagery as a valuable technique to engender emotional change, but with fundamental differences. In REBT, rational emotive imagery (REI; Maulstby, 1971) encourages individuals to imagine experiencing the problematic emotion in their minds eye, identify the specific irrational beliefs which are creating the emotions, and to change these to rational beliefs. Whereas in rescripting imagery (in ST), individuals are asked to imagine the memory as vividly as

possible, and to imagine that the sequence of events is changed in a direction that the person desires (Arntz, 2012). Here, in REI the core belief is the key focus of change, but in rescripting imagery the perception of events is the key focus of change.

This brief example of a dual REBT-ST approach could help the athlete to reduce the irrational beliefs of depreciation and the maladaptive schema of defectiveness. Of course, the work between client and practitioner is more nuanced, and future research could apply an integrated REBT-ST approach with athletes to record and examine its use and effectiveness. In addition, this dual approach is relevant only to athletes expressing both high irrational beliefs and high maladaptive schemas. On the evidence of past research, individuals can also present with high irrational beliefs and related automatic thoughts (e.g., Szentagotai & Freeman, 2007) in which case a dual REBT-CT approach to working with the client is perhaps warranted.

Future research should explore a model in which irrational beliefs, maladaptive schemas, and automatic thoughts co-occur to relate to psychological distress. In order to achieve this model in athlete samples, researchers should consider developing and validating athlete versions of psychometrics that assess maladaptive schemas (YSQ-S3), and automatic thoughts (Automatic Thought Questionnaire). Recently, a sport-specific irrational beliefs measure has been developed (iPBI-2; Turner & Allen, 2018), and should be used in future research with athletes. Also, in the current study we did not assess all possible schemas due to the procedural burden this would have placed on participants. Future research could assess more than just defectiveness, failure to achieve, and unrelenting standards to fully understand the prevalence of maladaptive schemas in athletes, and their cognitive, emotional, and behavioural associates.

Clearly, we cannot infer cause (cognitions) and effect (emotions), as the analyses demonstrate atemporal associations at a single timepoint. Whilst cognitive-behavioural theory

and research (e.g., Vîslă et al., 2016) suggests that psychological distress results from maladaptive cognitions, in the current study it may be the case that participants experiencing comparatively high psychological distress harbour maladaptive cognitions as a function, rather than a cause, of their anxiety and depression symptomology. Longitudinal investigations could determine how maladaptive cognitions influence change in psychological distress, and experimental research could more clearly examine the proposed cognitive mechanisms that cause psychological distress (Jose, 2016).

In conclusion, in the current study we examined the atemporal mediational effects of maladaptive schemas on the relationship between irrational beliefs and psychological distress in a sample of athletes. Results demonstrated that maladaptive schemas fully mediated the positive relationship between irrational beliefs and symptoms of psychological distress. This may suggest that maladaptive schemas is a potential mechanism through which irrational beliefs are related to psychological distress, a finding demonstrated in past research but with automatic thoughts (e.g., Buschmann et al., 2018) rather than maladaptive schemas. Results also revealed some associations between specific irrational beliefs and maladaptive schemas that could instigate further research. To develop this study further, a more comprehensive set of maladaptive schemas should be measured, longitudinal (temporal) mediation research methods should be adopted, and unified model of irrational beliefs, maladaptive schemas, and automatic thoughts should be developed and tested. Practitioners should explore the alignment of REBT and ST in practice and report their findings in scientific literature.

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Compliance with Ethical Standards:

Ethical approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Conflicts of Interest

Conflict of Interest: All authors declare that they have no conflicts of interest.

Highlights

- Maladaptive schema have not been examined in relation to irrational beliefs.
- The atemporal mediational effect of schema on irrational beliefs and distress is examined.
- Maladaptive schema mediated the relationship between irrational beliefs and distress.
- Athletes with greater distress had greater irrational beliefs and greater schemas.

Table 1. Pearson's correlation co-efficients for irrational beliefs, maladaptive schemas, and psychological distress (n = 214).

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**Mean(*SD*)**	**95 % CI**
Primary irrational beliefs (1)	-											26.58(*4.25*)	26 - 27.1
Low frustration tolerance (2)	**.58****	-										26.10(*4.79*)	25.4 - 26.8
Awfulizing (3)	**.82****	**.59****	-									14.53(*5.71*)	13.8 - 15.4
Depreciation (4)	**.47****	**.58****	**.56****	-								22.98(*5.38*)	22.3 - 23.8
Composite irrational beliefs (5)	**.84****	**.82****	**.88****	**.80****	-							22.52(*4.14*)	21.96 - 23.09
Defectiveness (6)	.07	**.14***	**.18***	**.43****	**.26****	-						8.54(*3.56*)	8.1 - 9.2
Failure to achieve (7)	.11	**.14***	**.19****	**.39****	**.26****	**.54****	-					9.38(*4.00*)	8.8 - 9.9
Unrelenting standards (8)	**.36****	**.52****	**.34****	**.32****	**.46***	**.21****	.10	-				20.14(*5.40*)	19.5 - 20.9
Total maladaptive schema (9)	**.28****	**.42****	**.35****	**.52****	**.48****	**74****	**.70****	**.71****	-			12.65(*3.01*)	12.24 – 13.06
Anxiety (10)	**.15***	**.21****	**.20****	**.27****	**.48****	**.35****	**.33****	**.16***	**.36****	-		3.38(*3.18*)	2.94 – 3.81
Depression (11)	**.15***	**.24****	**.19****	**.35****	**.29****	**.42****	**.37****	**.24****	**.44****	**.67****	-	3.82(*3.44*)	3.35 – 4.29
Psychological distress (12)	**.15***	**.24****	**.21****	**.33****	**.29****	**.42****	**.37****	**.21****	**.42****	**.90****	**.88****	7.68*(7.35)*	6.69 – 8.68

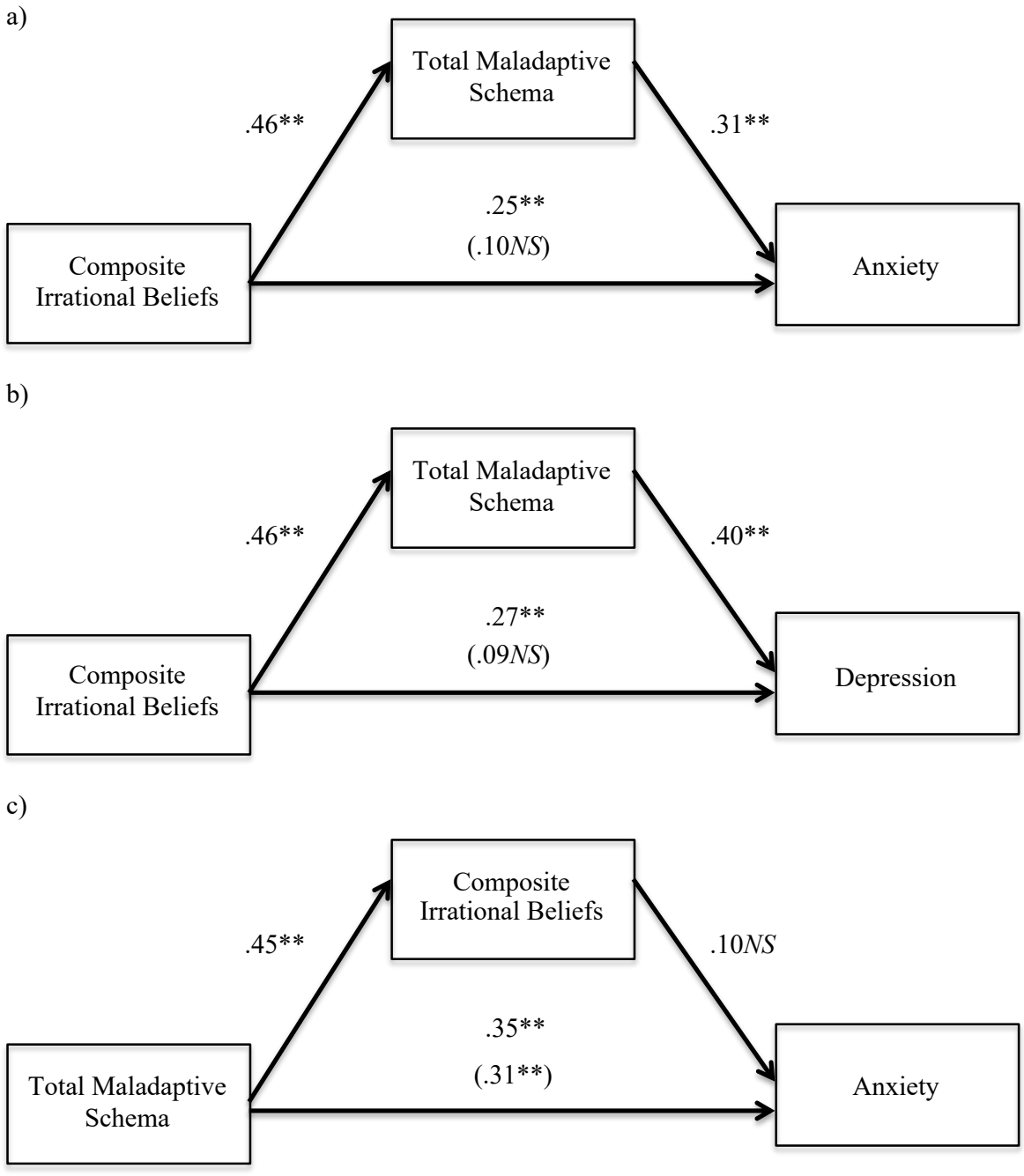
** $p < .01$ level, * $p < .05$.

Table 2. Simple mediation analyses between composite irrational beliefs (X) and psychological distress (Y) (models 1, 2, and 5), between total maladaptive schemas (X) and psychological distress (Y) (models 3, 4, and 6).

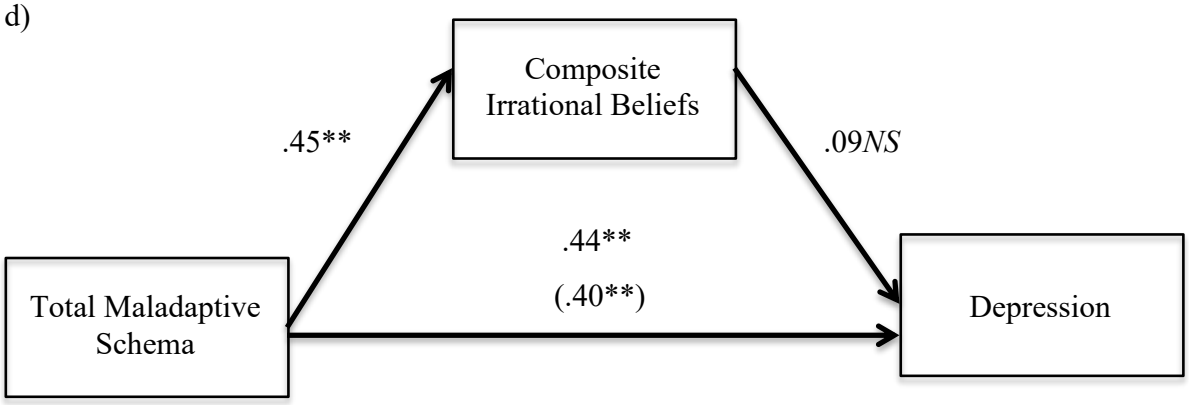
Model Number	(M)	(Y)	YR^2	Total c=t(df)=, P	Direct c'=t(df)=, P	Indirect effect
1	TMS	Anxiety	$R_2 = .38$ $F(4,206) = 8.54$, $P < .001$	.25 t(207) = 3.54, $P = .001$	.10 $t(206) = 1.38$, $P = .17$	.14 [.061 to .231]
2	TMS	Depression	$R_2 = .46$ $F(4,206) = 13.80$, $P < .001$	.27 t(207) = 3.98, $P < .001$	.09 $t(206) = 1.23$, $P = .22$	.18 [.107 to .271]
3	CIB	Anxiety	$R_2 = .38$ $F(4,206) = 8.54$, $P < .001$	.35 t(207) = 5.35, $P < .001$	.31 $t(206) = 4.14$, $P < .001$	.05 [-.019 to .119]
4	CIB	Depression	$R_2 = .46$ $F(4,206) = 13.80$, $P < .001$	.44 t(207) = 6.94, $P < .001$	.40 $t(206) = 5.62$, $P < .001$	.04 [-.027 to .113]
5	TMS	Distress	$R_2 = .44$ $F(4,206) = 12.21$, $P < .001$	.28 t(207) = 4.03, $P < .001$	.11 $t(206) = 1.47$, $P = .144$	.17 [.097 to .255]
6	CIB	Distress	$R_2 = .44$ $F(4,206) = 12.21$, $P < .001$	.42 t(207) = 6.48, $P < .001$	.37 $t(206) = 5.12$, $P < .001$	.05 [-.015 to .119]

Note. TMS = total maladaptive schemas; CIB = composite irrational beliefs

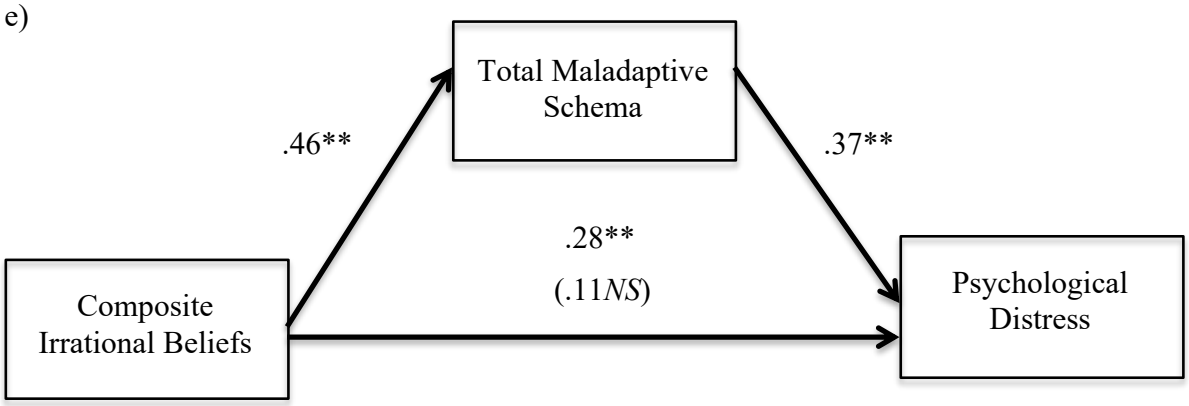
Figure 1. Mediational diagrams for all six models (a, b, c, d, e, f). Values not in parentheses reflect bivariate (β) relations, and values in parentheses reflect multivariate relations accounting for other variables in the regression equation. Significance values were at $*p <$ .05, $**p \leq .001$.



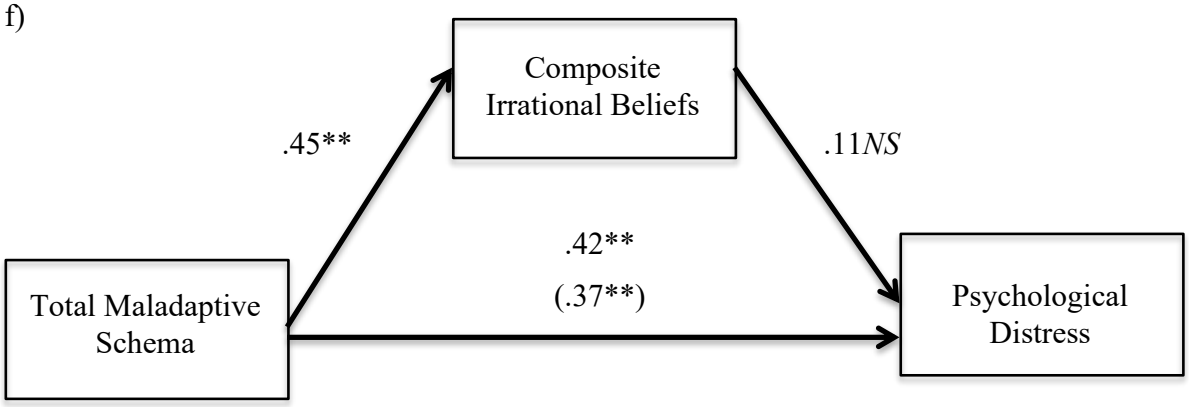
d)


Composite Irrational Beliefs
.45**
.09NS
.44**
(.40**)
Total Maladaptive Schema
Depression

e)


Total Maladaptive Schema
.46**
.37**
.28**
(.11NS)
Composite Irrational Beliefs
Psychological Distress

f)


Composite Irrational Beliefs
.45**
.11NS
.42**
(.37**)
Total Maladaptive Schema
Psychological Distress

1

2